

A CIRCADIAN RHYTHM OF CONIDIATION IN NEUROSPORA CRASSA
L-12

Prof. Yashuhiro Miyoshi
University of Shizuoka
Japan

Outline of Experiment

Two fungi growth chambers containing six growth tubes each are used in this experiment. One chamber is for the space experiment; the other is for the simultaneous ground control experiment. The hyphae of Neurospora crassa band A mutant are inoculated at one end of each tube. Both the chambers are kept at $3\text{ }^{\circ}\text{C} \pm 1.5\text{ }^{\circ}\text{C}$ to stop hyphae growth until the Spacelab is activated. After the activation, each chamber is transferred simultaneously to the Spacelab and a phytotron in KSC and kept in continuous light at the same temperature. After about 24 hours of light exposure, each chamber is inserted into a growth chamber bag to keep it in constant darkness. The circadian rhythm of conidiation is initiated by this light to dark transition. After the dark incubation for 5 days at room temperature, both the growth chambers are kept at $3\text{ }^{\circ}\text{C} \pm 1.5\text{ }^{\circ}\text{C}$ to stop growth of the hyphae. After the space shuttle lands, both conidiation patterns are compared and analyzed.

Purpose of Experiment

It has been known that numerous physiological phenomena show circadian rhythms. They are characterized by the fact that the oscillation can persist under constant conditions of light and temperature. Therefore, it has been accepted by most investigators that the generation

mechanism of the circadian rhythm is endogenous. However, one cannot reject the possibility that these rhythms are caused by some geophysical exogeneous factor having a 24-hour period, such as atmospheric pressure, gravity, or electromagnetic radiation.

In this study, we use Neurospora crassa band A mutant which shows an obvious circadian rhythm in its spore-forming (conidiation) on the ground, and we intend to attempt the conidiation of this mutant in the Spacelab where 24-hour periodicity is severely attenuated and to elucidate the effect of the geophysical exogeneous factor in the generation mechanism of the circadian rhythm.

DAY	TIME	DESCRIPTION OF CREW OPERATION
0	4 8 12 16 20	<p>Transfer Fungi growth chamber to SL and attach to SSC#1 door, set up Temp. sensor.</p> <p>Report time on voice.</p>
1	4 8 12 16 20	<p>Take close up photo, cover Fungi growth chamber with growth chamber bag.</p>
2	4 8 12 16 20	<p>Report time on voice.</p>
3	4 8 12 16 20	
4	4 8 12 16 20	<p>Uncover and take close up photo.</p>
5	4 8 12 16 20	<p>Report time on voice</p>
6	4 8 12 16 20	<p>Stow close up apparatus, Temp. sensor. Transfer Fungi growth chamber to MD and stow in Refrigerator.</p>

Figure 1. L-12 time line.

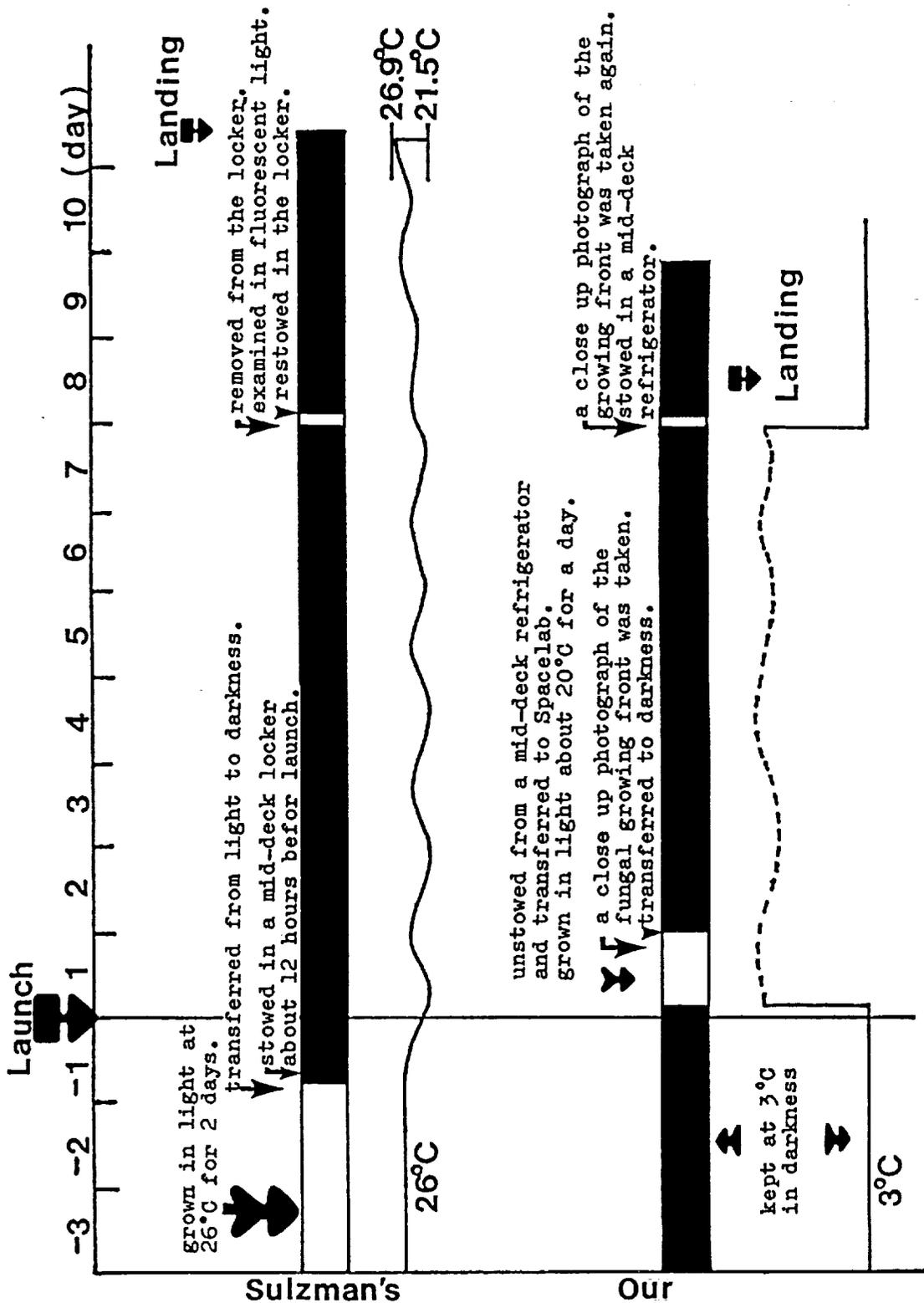


Figure 2. Some differences between Sulzman's and our procedures.